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WORLD RICE STUDY:
A Software Package for Analyzing International Trade

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WORLD RICE STUDY: A SOFTWARE PACKAGE FOR ANALYZING INTERNATIONAL TRADE. By Theo F. Moriak, Roger P. Strickland, and Warren R. Grant. Economic Research Service, U.S. Department of Agriculture, ERS-609.

ABSTRACT

A software package for analyzing international trade in rice on a continuing basis is explained. The report serves as background information for a world rice model developed to trace the impact that changes in world conditions and policies have on U.S. rice program costs and prices. Researchers can use the software package as a base for studying other commodities.

Key words: Rice, international trade, linear programming.

Washington, D.C. 20250 October 1975

PREFACE

This report is part of an informal effort between the Department of Agricultural Economics and Rural Sociology, University of Arkansas; Department of Agricultural Economics, Texas A&M University; and the Economic Research Service (ERS), U.S. Department of Agriculture. The task force working on the study is composed of:

Warren R. Grant, Commodity Economics Division, ERS, College Station, Texas

Wade F. Gregory, Foreign Demand and Competition Division, ERS, Washington, D.C.

Gene R. Hasha, Foreign Demand and Competition Division, ERS, Washington, D.C.

Theo F. Moriak, Commodity Economics Division, ERS, Washington, D.C.

William R. Morrison, Arkansas Agricultural Experiment Station, Fayetteville, Arkansas

Troy Mullins, Commodity Economics Division, ERS, Fayetteville, Arkansas

Roger P. Strickland, Office of the Administrator, ERS, Washington, D.C.

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WORLD RICE STUDY: A SOFTWARE PACKAGE FOR ANALYZING INTERNATIONAL TRADE

by

Theo F. Moriak, Roger P. Strickland, and Warren R. Grant[1/]

INTRODUCTION

The United States has significant influence on the world rice market because it is the major supplier. Likewise, trade movements of rice are significant to the U.S. rice industry since a substantial part of U.S. production is exported.

This report explains a software package for analyzing international trade in rice on a continuing basis. It serves as background information for other reports dealing with a world rice model developed to trace the impact that changes in world conditions and policies have on U.S. rice program costs and prices. Other reports include the basic sets of equations used to develop the model; a compilation of data used to develop the equations; and an analysis of the world rice economy.

As the software package took shape, it became evident that it had research implications for other commodities. Therefore, this report shows how the package was used for rice, and researchers can use it as a base for studying other commodities.

The world rice trade model is a national-level, behavioral approach. Its design permits the inclusion of (1) linear production and consumption functions containing both endogenous and exogenous variables, (2) price relationships relating types of rice, marketing stages, and geographic locations, and (3) variables reflecting government policies, generally by including price relationships that reflect subsidies and tariffs and by placing floors or ceilings on production, consumption, trade, and prices.

Alternative policy situations can be analyzed very quickly and inexpensively. A matrix generator was developed which takes the country's production, disappearance, and price relationships and prepares them in IBM's mathematical programming solution algorithm (MPS) code. A report writer was tied on the end of the LP algorithm to develop tables of the input as well as the solution information. Thus, the results of an analysis are communicated readily to policymakers.

The matrix generator and report writer can handle up to 3 commodities and 39 production and consumption areas. However, some inconvenience

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1/ Agricultural Economist, Commodity Economics Division (CED), Economic Research Service (ERS), U.S. Dept. of Agr., stationed in Washington, D.C.; Agricultural Economist, Office of Administrator, ERS, stationed in Washington, D.C.; and Agricultural Economist, CED, ERS, stationed in College Station, Tex.

would be experienced in the labeling on the report tables because they refer to rice.

The software package was designed for use by researchers not intimately familiar with MPS. It also easily accommodates changes in parameters, levels of exogenous variables and functional relationships. Consequently, it contributes to an economist's ability for quickly generating economic intelligence of international trade on a continual basis.

The model's use as a tool for developing estimates of the impact of alternative government policies is not restricted to those of the United States. Since all major producers and consumers of rice are in the model, researchers in other countries may also find the analytical framework useful for their policy and program analysis.

WORLD TRADE MODEL

The model was contructed along the lines of a generalized linear programming matrix and it utilized a LP algorithm for arriving at solutions. Conceptually, the model was a set of simultaneous equations with a set of restraints to incorporate the effects of government policies and resource restrictions. The modeling framework is similar to that reported by Rojko, Urban, and Naive [1]. The objective function optimized production. The behavioral aspects of the model provided means of tracing out the specific effects of certain sets of conditions or actions, such as government policies.

Among the alternative government policies, both foreign and domestic, that might be assessed are the effects of (1) production and stock programs, (2) price supports, (3) export subsidies, (4) import quotas, (5) devaluation, and (6) food aid programs, such as P.L. 480. Examples of supply and demand shifters whose impact can be analyzed are (1) consumer incomes; (2) consumer taste changes from one commodity to another; (3) weather conditions; (4) Green Revolution factors, such as new seed varieties and production practices, fertilizer and fuel shortages, climatological conditions, and biological phenomena, and (5) population.

Types of Variables

Three types of variables are used in the model: variables estimated within the LP framework; variables estimated from outside information; and variables showing effects of public program decisions. Each variable has a coefficient.

Endogenous variables, prices, and quantities of the commodity are determined within the LP model and are thus the unknowns to be estimated by solving the model. They appear as columns within the LP matrix framework with their corresponding coefficients as elements.

Exogenous variables are those determined principally by factors other than commodity prices and quantities, and are thus predetermined outside the LP model. Examples of exogenous variables are a country's land base, fertilizer and fuel supplies, weather, and population. Variables important for a particular analysis but not appearing in the historical data are also considered exogenous factors. These include adjustments for rebuilding pipeline stocks, war, and unprecedented weather changes.

Policy or institutional variables are generally predetermined for the LP model. Some are considered as restraints on the endogenous variables. Examples are price supports, price ceilings, acreage allotments, and import restraints. Other policies affect the level of exogenous variables. Examples of such influences are fertilizer and fuel allocation programs, irrigation systems, drainage projects, and birth control efforts. Policies affecting farmer response parameters include research and extension. Consumer behavior is permanently altered through education, disaster relief, and market development programs. Examples of policy variables being endogenous to the LP framework are variable-import levies and residual buyer (Commodity Credit Corporation, for instance) operations.

Types of Equations

The equations or rows used in the LP model are of four basic types: production relationships, disappearance functions, price linkages, and market clearing identities.

The exogenous variables are consolidated with the equation intercept into a constant, which was positioned in the right-hand side (RHS) vector. Consolidated denotes multiplication of each exogenous variable's coefficient by its level determined outside the LP model and summation of all such products with the equation intercept.

Production response shows how quantity produced was related to price and other factors. For some countries, it is a combination of several subfunctions to depict various resource situations. The only restriction is that they be additive to make an aggregate production function linear in the endogenous variables. Variables appearing as endogenous in these response functions are prices and quantities of the included commodities. Prices and quantities of competing commodities outside the system, weather, land area, high-yielding varieties, irrigation, and fertilizer are specified as exogenous variables.

Disappearance relationships depict domestic demand. Endogenous variables are prices and quantities for the included commodities. Exogenous variables are specified as prices or quantities of substitutes outside the system, population, income, and trend. In cases where production is largely for subsistence, supply is used as a proxy variable for income and is endogenous to the model.

Price linkage relationships are expressed as a constant difference between two prices or a functional relationship among two prices and other exogenous variables.

Market clearing identities for each commodity are included in the model. These assure that there is sufficient production to meet disappearance and that production does not take place unless it is needed. Setting the RHS to something other than zero permits analysis of the accumulation of stock drawdown on a worldwide basis, where the researcher specified stock change.

Mathematical Formulation

In the mathematical formulation of the model, assume each area produces commodities whose supplies are represented as S(ij), where i = 1,..I countries and j = 1,..J commodities. Disappearance is represented as D(ij). The general theoretical formulation for a single commodity is shown in figure 1. The following discussion condenses a report by Strickland and Moriak [3].

Production in a given country responds to the expected farm price PF(ij) and other exogenous variables X(ik), where k denotes such things as weather, fertilizer, irrigation, other commodity prices, and acreage allotments. The supply functions are represented as:

$$S(ij) = f(PF(ij), X(ik)).$$

Because of the lack of time series data on quantities by type of rice, only one rice supply function was estimated for each area. Estimated shares of production PS(ij) were used to allocate total rice supply to each type of rice as:

$$S(ij) = PS(ij)*(f(PF(i), X(ik)).$$

Where: $\sum_{j} PS(ij) = 1.$

The model enables separate functions by type of rice when and if data become available. This would be done by incorporating new relationships into the model and inserting 100 percent for the appropriate PS(ij) denoting type of rice.

Disappearance in a given country responds to the domestic retail price PR(ij) and other exogenous variables Z(ik), such as population, prices of competing commodities, and income. It is represented as:

$$D(ij) = f(PR(ij), Z(ik)).$$

The total disappearance functions for rice in each country are allocated to types of rice using estimated shares of utilization. The procedure was similar to that used in allocating total supply to each type of rice.

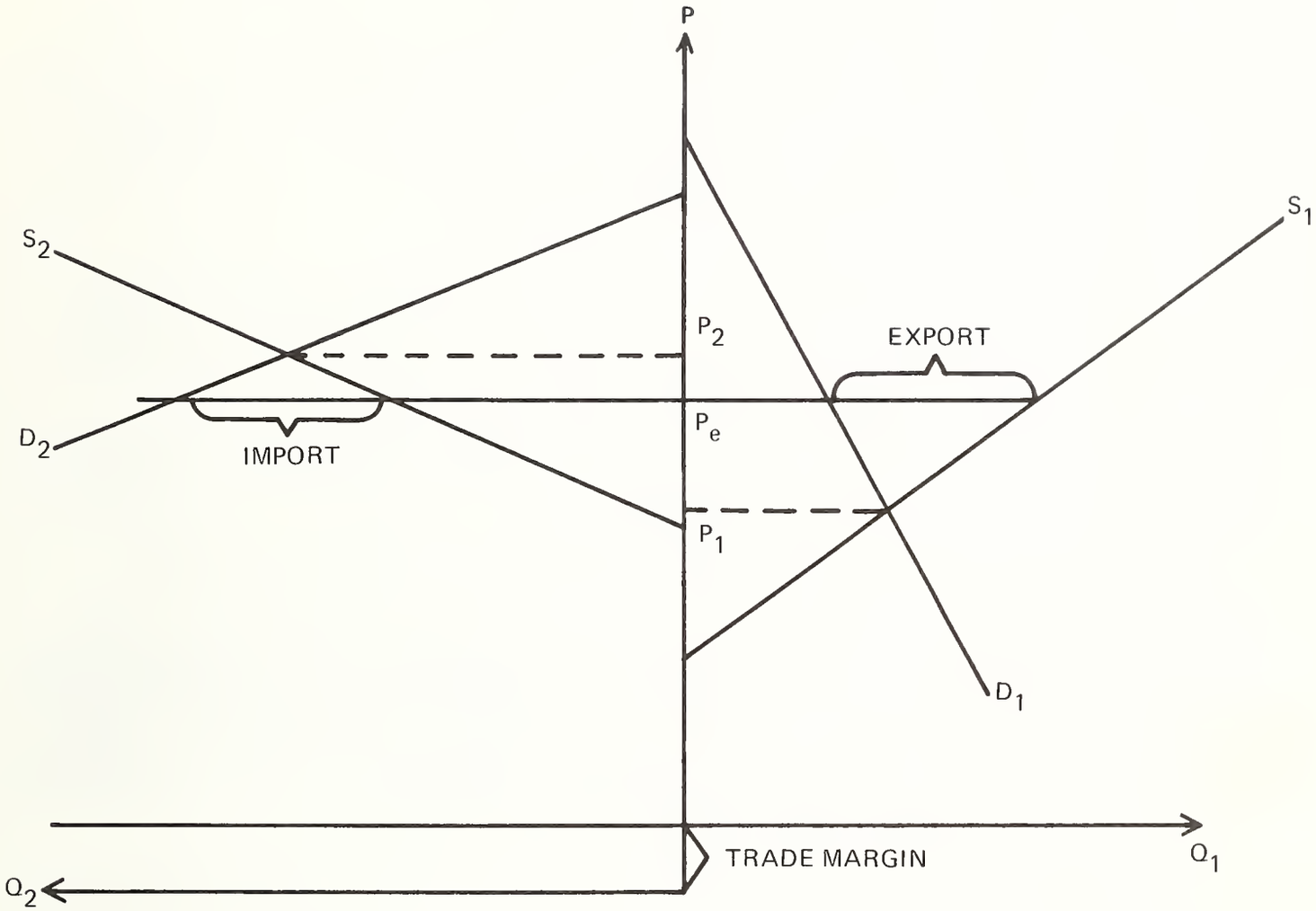

FIGURE 1. SUPPLY AND DEMAND RELATIONSHIPS FOR TWO TRADING REGIONS OF A SINGLE COMMODITY

The relationship between farm prices and retail prices can be affected by exogenous variables Y(ik), such as trend and government policies. The relationships are represented as:

$$PF(ij) = f(PR(ij), Y(ik)), \text{ for all } j = j.$$

The relationship between domestic prices PF(ij) or PR(ij) and international prices PE(ij) at the port of entry or export was established in a similar manner. Exogenous factors, such as trend and government policies, are represented by W(ik). The relationships are formulated as:

$$PF(ij) = f(PE(ij), W(ik)) \qquad \text{(exporter);}$$

$$PR(ij) = f(PE(ij), W(ik)) \qquad \text{(importer); for all } j = j.$$

The relationships among the port prices for each commodity are included in order to tie the price structure of the countries together using one price series as a base PW(j). A single relationship between each country's port price and PW(j) suffices to tie all countries together. Exogenous factors, such as trend and government policies, are represented by V(ik). The relationship was expressed as:

$$PE(ij) = f(PW(j), V(ik)), \text{ for } j = j.$$

The relationships among the world price levels by commodity where exogenous factors, such as trend, are shown as T(ik) are represented as:

$$PW(j) = f(PW(j), T(ik)), \text{ for all } j \neq j.$$

Market clearing identities are used to ensure that all production was utilized and none was produced which was not needed. These identities are expressed as:

$$\sum_i S(ij) - \sum_i D(ij) = 0 \text{ for all } j = j.$$

Government policies are expressed in several ways. Some are quantified as continuous or dummy variables in the appropriate functions. Some policies influenced the level of other exogenous variables, such as the use of fertilizer and irrigation. Production, consumption, price, and trade control policies are formulated in restraints as follows:

$$S(ij) \gtreqless SR(ij) \qquad \text{(production restraint)}$$

$$D(ij) \gtreqless DR(ij) \qquad \text{(disappearance restraint)}$$

$$\left.\begin{array}{l} PF(ij) \lesseqgtr PRC(ij) \\ PR(ij) \lesseqgtr PRC(ij) \end{array}\right\} \qquad \text{(price ceiling or floor restraints)}$$

$$(S(ij)-D(ij) \lesseqgtr ER(ij) \qquad \text{(import or export restraint)}$$

An alternative method of incorporating government policies in the model includes the possibility of changing parameters in particular functions. Consequently, there is a rather wide range of options available for quantifying domestic and international policies.

The LP matrix configuration, with the impacts of the exogenous variables consolidated into the intercept, is shown in table 1. The matrix is block diagonal with each country representing a block. The international price linkage and market clearing rows tie the blocks together. The policy restraints are shown separately to denote their economic importance. However, mathematically, they could be put into the relevant country blocks.

In the next section, the procedures for making analyses with alternative levels of exogenous variables, policy restraints, and functional relationships are explained.

ANALYTICAL PROCEDURES

The solution of the model is a multistep process involving two FORTRAN programs interfaced with MPS. The procedure for linking FORTRAN to MPS is reported by Strickland and Davis [2]. The IBM 360/MPS routine is a computerized LP algorithm. One FORTRAN program precedes MPS; the second follows. The former, called the matrix generator, provides MPS with the necessary data in the required format, based on the parameters of the equations, the levels of the exogenous variables, and codes denoting forms of the equations.

The latter FORTRAN program is a report writer. It tabulates and prints relevant portions of the results along with the explicitly assumed levels of the exogenous variables and their corresponding coefficients in the production and disappearance equations. These calculations and organization of information within a few additional seconds after the LP solution are helpful to the researcher in compiling results. In addition to being a time and labor saver, the report writer eliminates some of the human error from this stage of the operation.

The principal benefits of the matrix generator are the reduction of errors and labor. It reduces the number of characters that must be punched on cards by approximately 70 percent. Eliminated are errors associated with (1) setting-up the problem in LP matrix form, which entails at least a mental conceptualization depicting the position within the matrix of every item in each equation, and (2) transforming this matrix into detailed MPS data. Errors associated with consolidating the impacts of the exogenous variables with the intercept are eliminated by performing computations in the matrix generator. However, opportunities for errors do occur in coding and punching the numerical data for the matrix generator.

Table 1--Consolidated matrix configuration for two countries trading in one commodity with public policy restraints and no stock change

Max Z	1.0						1.0						
	S(1)	D(1)	PF(1)	PR(1)	PE(1)	PS(1)	S(2)	D(2)	PF(2)	PR(2)	PE(2)	PW	RHS
Exporter													
Production	1		-b										= a
Disappearance		1		b									= a
Price linkage													
Farm-retail			1	-b									= a
Importer													
Production							1		-b				= a
Disappearance								1		b			= a
Price linkage													
Farm-retail									1	-b			= a
Retail-port										1	-b		= a
World													
Price linkage													
Exporter-world					1							-b	= a
Importer-world											1	-b	= a
Market clear	1	-1					1	-1					= 0
Policy restraints													
Farm price floor			1										$\geq$ a
Retial price ceiling									1				$\leq$ a
Export subsidy			1		-b	-1							= a

Information and Calculation Process

The overall analytical process of developing parameter estimates, coding input data, solving on the computer, and evaluating results is shown in figure 2. Analysis of impacts due to alternative government policies, weather conditions, technological situations, or income growth paths is done by specifying the levels of the exogenous variables, altering the response parameters, changing the restraints, or including revised relationships in the first loop. Each analysis requires careful evaluation of the information in that loop because it is the structure upon which the analysis in the second loop and recommendations to policymakers in the final section are based.

Coding Input Data

The input requirements for using this software package are many and varied. The matrix generator requires the forms of the equations, its parameters, the levels of the exogenous variables, and the kind of equation. The report writer needs the country names, names and units for the exogenous variables, and regional configurations. In addition, there are options for printing tables, selecting output devices, specifying the objective function, etc.

The card deck set-up is shown in figure 3. There are 22 segments to the deck--including the JCL portions. This section of the report describes the input data by referring to those numbered segments. They are not discussed in ascending order but in terms of how the problem was organized. Each segment is discussed briefly, its information is described, the card format specified and restrictions, if any, are noted.

Variable names.--Segment 5 of figure 3 is a master list of all unique endogenous and exogenous variables in the equations. The code numbers are used to connect the variables used by the matrix generator with the report writer. The coding shown in table 2 was constructed as:

1. Variable code number.
2. Variable name.
3. FØRMAT (I4, 9A4, I4, 9A4).
4. Restrictions--User defines 2 variable names per card and includes 28 cards with consecutive code numbers. Blanks are used for names as appropriate.

Variable units.--Segment 6 of figure 3 is a master list of unique units for all the endogenous and exogenous variables in the production and disappearance equations. They are linked with the variable names by the report writer. The coding shown in table 3 was constructed as:

1. Unit code number.
2. Unit name.
3. FØRMAT (I4,9A4, I4, 9A4).

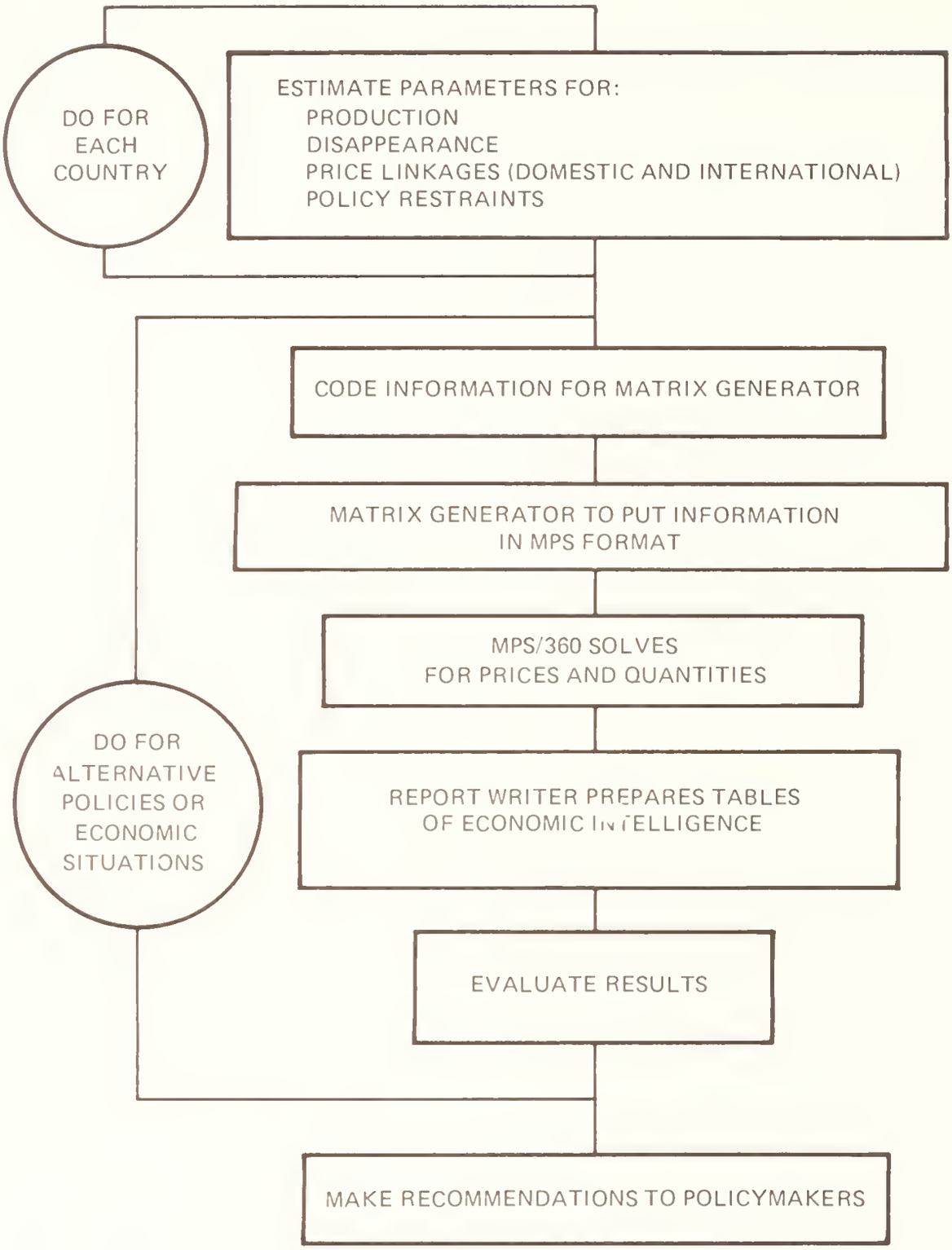

FIGURE 2. FLOWCHART OF ANALYSIS PROCESS

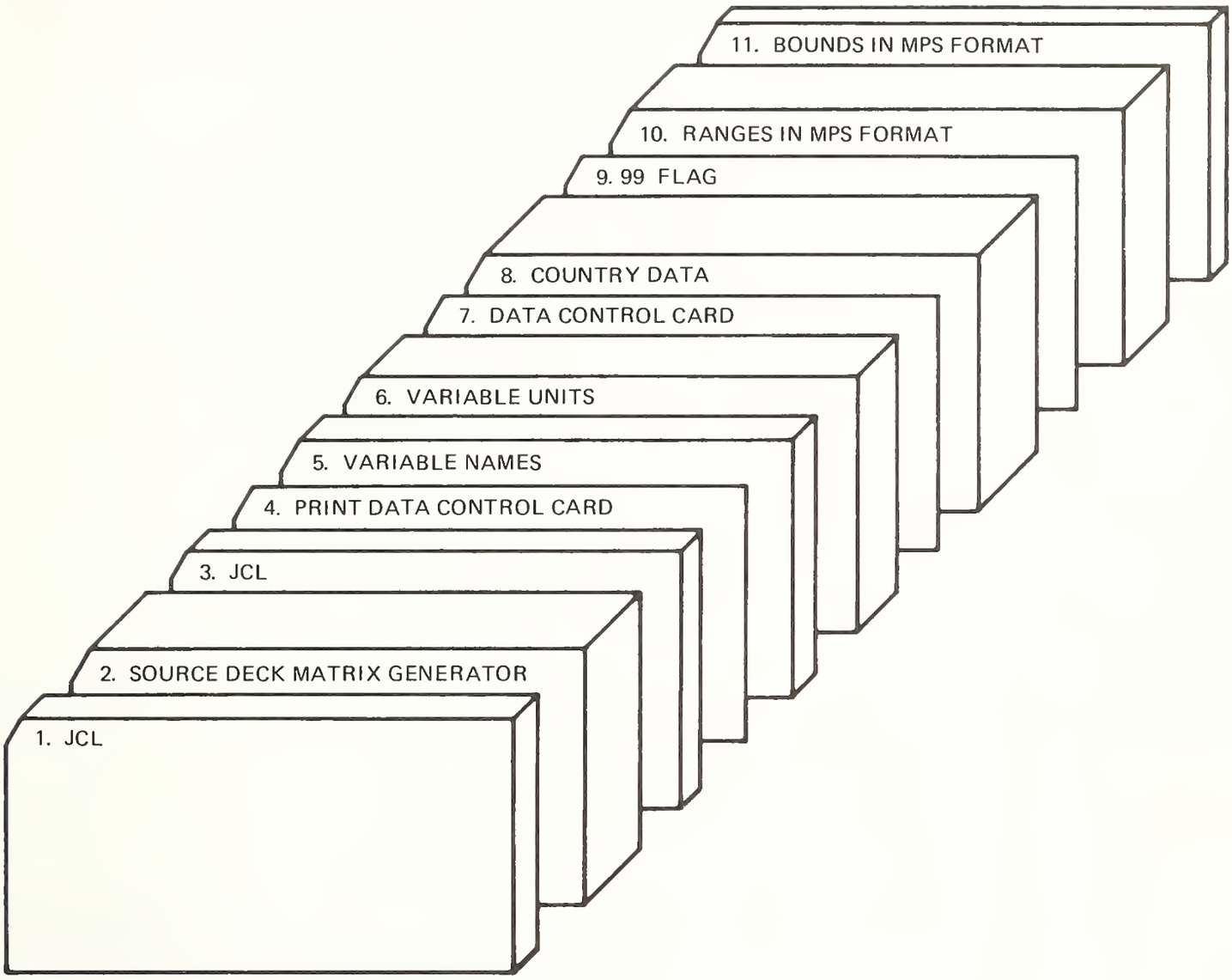

FIGURE 3. CARD DECK SET-UP

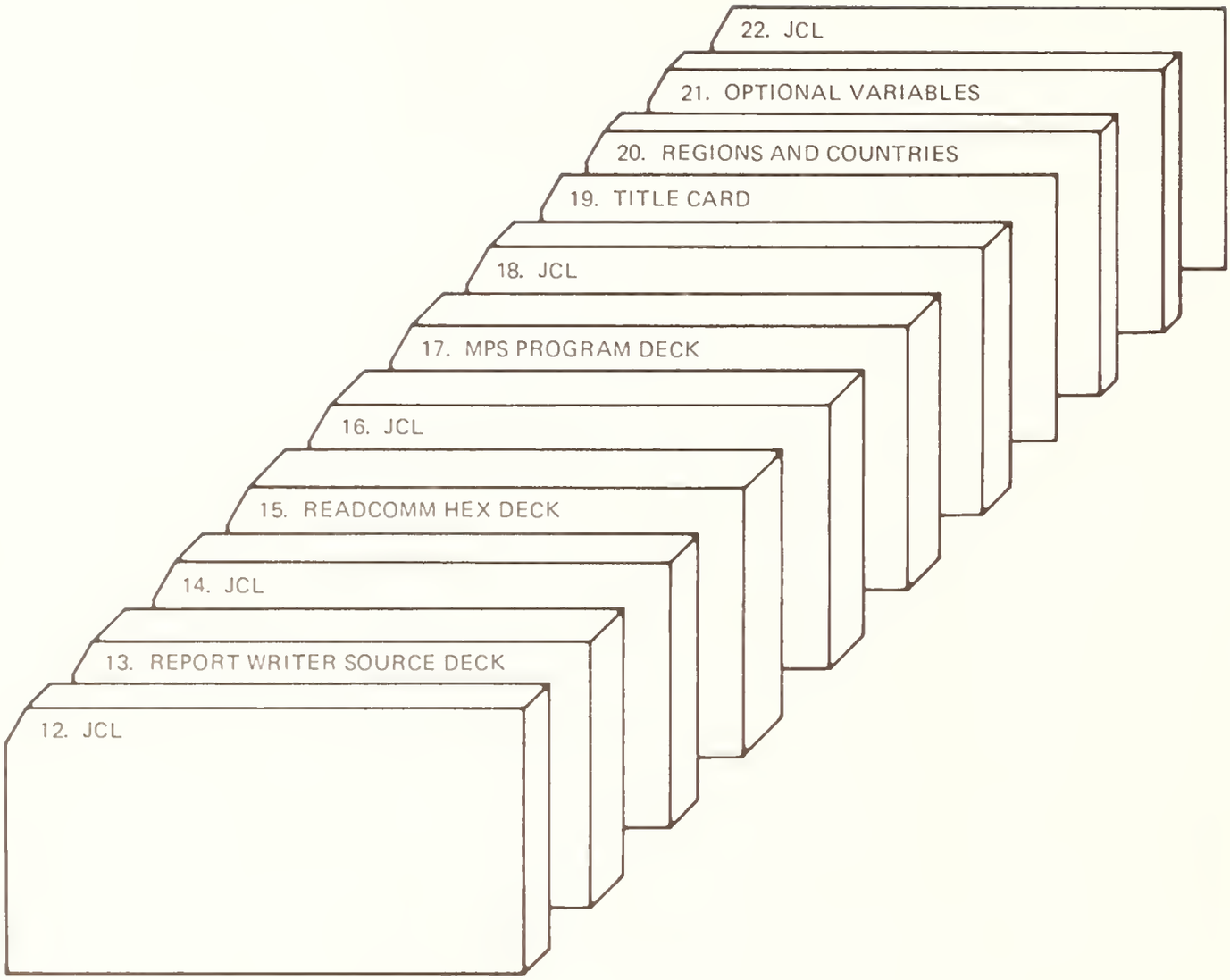

FIGURE 3. CARD DECK SET-UP (CONTINUED)

Table 2--Master list of variable names

1INTERCEPT / CONSTANT TERM	2LONG GRAIN WHOLESALE PRICE
3INCOME	4LONG GRAIN FARM PRICE
5ALLOTMENT	6TECHNOLOGY
7SHORT GRAIN WHOLESALE PRICE	8SHORT GRAIN QUANTITY DEMANDED
9LONG GRAIN QUANTITY DEMANDED	10WEATHER
11SHORT GRAIN FARM PRICE	12POPULATION
13LOW QUALITY RETAIL PRICE	14WHEAT RETAIL PRICE
15LOW QUALITY FARM PRICE	16HIGH YIELDING VARIETIES
17FERTILIZER	18IRRIGATION
19LONG GRAIN IMPORT PRICE	20TIME
21CORN FARM PRICE	22LONG GRAIN RETAIL PRICE
23CORN WHOLESALE PRICE	24SHORT GRAIN EXPORT PRICE
25YIELD/HECTARE	26WHEAT FARM PRICE
27WAR	28LOW QUALITY WHOLESALE PRICE
29BARLEY	30POLICY
31SHORT GRAIN RETAIL PRICE	32LOW QUALITY QUANTITY DEMANDED
33WHEAT EXPORT PRICE	34POTATO PRICE
35CORN MEAL WHOLESALE PRICE	36LOW QUALITY EXPORT PRICE
37LONG GRAIN QUANTITY PRODUCED	38WHEAT WHOLESALE PRICE
39WHEAT IMPORTS	40LOW QUALITY EXPORT PRICE
41SHORT GRAIN QUANTITY PRODUCED	42SHORT GRAIN QUANTITY DEMANDED
43LONG GRAIN QUANTITY DEMANDED	44SUGAR CANE FARM PRICE
45POOR QUALITY SUPPLY	46RYE WHOLESALE PRICE
47PRODUCTION	48WHEAT IMPORT PRICE
49IRRIGATED YIELD	50AREA IN RICE
51FAO LONG MED GRAIN PRICE INDEX	52FAO ROUND GRAIN PRICE INDEX
53SEVERE DROUTH	54MODERATELY SEVERE WEATHER
55NEXT YEAR'S AREA IN RICE	56RETAIL PRICE DRY BEANS

Table 3--Master list of units

1U.S. $ PER METRIC TON	2MILLION U.S. $
3TEXAS $ PER METRIC TON	4INDEX
5LOUISIANA $ PER METRIC TON	6THOUSAND HECTARES
7CALIFORNIA $ PER METRIC TON	80= GOOD 1= POOR
9THOUSAND	10MILLION
110= POOR 1= GOOD	12PERCENT OF IRRIGATED HECTARES
13THOUSAND METRIC TONS	14PERCENT OF TOTAL HECTARES
15MILLION US.S. $	16YEAR 1960=60
17KILOGRAM	18BILLION U.S. $
19U.S. $ PER METRIC TON(INVERSED)	20THOUSAND HECTARES ROUND GRAIN
21THOUSAND HECTARES	220= GOOD 1 = POOR (CALIFORNIA)
23THOUSAND HECT (SOUTH SHORT GRAIN)	240= poor 1= GOOD (South)
25U.S.DOL.	26METRIC TON
27THOUSAND U.S. DOL.	28THOUSAND HECTARES IRRIGATED
29IN. RAINFALL	30MM. RAINFALL
31MILLION HECTARES	32
33	34

4. Restrictions--User defines 2 unit names per card and includes 17 cards with consecutive code numbers. Blanks are used for unit names as appropriate.

Country data.--Segment 8 of figure 3 contains information specific to each country. It has the country name followed by the disappearance equation, the production equation, and several price relationships.

The estimated equations for U.S. round and long grain production areas are given in table 4. There are equations for round grain disappearance (QUSSD) and production (QUSSS); an equation for the price relationship between the round grain farm price used in the supply equation (PUSSSFAR) and the round grain wholesale price (PUSSDWHO) used in the disappearance function; a round grain export subsidy (PUSSXSUB) relationship with the FAO round grain price index (PFAOEXR); and a restraint holding the round grain wholesale price (PUSSDWHO) at $202 per metric ton. A similar set of equations is shown for long grain rice except that the long grain wholesale price (PUSLDWHO) is restricted at $225 per ton. These restraints depict internally the effect of given levels of price support. The export subsidy in the export price equations takes up the slack between internal prices and trade prices. The following shows how the information from table 4 was coded for the software package in table 5.

The country name cards (sections 1 and 13 of table 5) provided the following general information. They were constructed as:

1. Three characters identifying the country. This was used by the matrix generator to set up the MPS code names.
2. Country name used in the summarized country reports.
3. Proportion of aggregate production allocated to three commodities, e.g., high-quality long grain, high-quality round grain, and low quality. If production equations were estimated individually, a 1.0 was used for the appropriate commodity to indicate that no allocation process was needed.
4. Similar information to set 3 above for disappearance.
5. FØRMAT (10X, A3, 27X, 2A8, 6F4.3).
6. Restriction--No more than 39 countries can be used in the analysis.

The disappearance equation variables (sections 2 and 14 of table 5) provide the following specific information about the nature of disappearance. They were constructed as:

1. Equation type--"2" denotes that the equation represents total disappearance; "3" denotes that it represents per capita disappearance and the matrix generator will multiply by population to obtain total disappearance.
2. Number of regressor variables plus 1--the "1" accounts for the intercept; includes population in a per capita function as a regressor.

Table 4--Equations used in the model for the U.S. round grain and long grain production areas

(1) *Round grain disappearance*

QUSSD = [1.52373 - .000257PUSSDWHO + .000084YPC + .000548HARG1 + .00124PRDB + .004607T - .001953QDLG]POP

(2) *Round grain production*

QUSSS = - 25.98 + .2997PUSSSFAR + 37.18TECH - 30.63WEAT + 3.593HASG

(3) *Round grain wholesale price - rough grain farm price relationship*

PUSSDWHO = - 41.43 + 2.185PUSSSFAR

(4) *Round grain export subsidy - FAO round grain price index relationship*

PUSSXSUB = 520.9852 - .79287PFAOEXR - 5.9786T

(5) *Round grain wholesale price effective support level*

PUSSDWHO = 202.

(6) *Long grain disappearance*

QUSLD = [-6.01157 - .000996PUSLDWHO - .000552YPC + .00364PRP + .000548HAG1 + .16455T + .0013QDRG]POP

(7) *Long grain production*

QUSLS = - 3030.354 + 1.0084PUSLSFAR + 32.7839T + 4.359HALG - 319.8166WEAT

(8) *Long grain wholesale price - long grain farm price relationship*

PUSLDWHO = - 75.12 + 2.663PUSLSFAR

(9) *Long grain export subsidy - Thailand long grain export price relationship*

PUSLXSUB = 223.9032 - 1.1741PTHAEXH

(10) *Long grain wholesale price effective support level*

PUSLDWHO = 225.

Table 5--Country coding for U.S. round and long grain production areas

Section											
							Card image				
(1)	0		USS				USA SHORT GRAIN 0.0	0.7000.3000.0	0.8500.150		
(2)	13	7 2	WHOLESALE PRICE	7 1			INCOME	325			
			PRICE DRY BEANS	56 1			TIME	2016			
			HARG PLUS ONE	5521			POPULATION	1210			
(3)	0		1.52	-0.000	0.0	0.000	4174.0	0.001	489.0		
				0.005	71.0	0.001	62.0	0.0	207.0		
(4)	-1		QUSLDL 4313			-0.0020					
	0		QUSLDP 3213			-0.0020					
(5)	01	5 0	FARM PRICE	11 7			WEATHER	1022			
			TECHNOLOGY	624			AREA SHORT GRAIN	5020			
(6)	0		-25.98	0.300	0.0	-30.630	1.0	37.180	1.0		
				3.593	67.0						
(7)	70	4 0	RUSSWHFA	0 0			PUSSDWHO	0 0			
			PUSSSFAR	0 0							
(8)	0		-41.43	2.185	0.0						
(9)	79	5 0	RUSSSUB	0 0			PUSSXSUB	0 0			
			PFAOEXR	0 0			TIME	0 0			
(10)	0		520.99	-0.793	0.0	-5.979	71.0				
(11)	70	3 0	RUSSSUP	0 0			PUSSDWHO	0 0			
(12)	9		202.00	0.0	0.0						
(13)	0		USL				USA LONG GRAIN 0.7000.0	0.3000.8500.0	0.150		
(14)	13	7 2	WHOLESALE PRICE	2 1			INCOME	325			
			TIME	2016			POTATO PRICE	34 1			
			HALG PLUS ONE	5521			POPULATION	1210			
(15)	0		-6.01	-0.001	0.0	-0.001	4174.0	0.165	71.0		
				0.004	190.0	0.001	676.0	0.0	207.0		
(16)	-1		QUSSDS 813			0.0041					
	0		QUSSDP 3213			0.0041					
(17)	01	5 0	FARM PRICE	4 3			ALLOTMENT	5021			
			TIME	2016			WEATHER	10 8			
(18)	0		-3030.35	1.008	0.0	4.360	738.0	32.784	71.0		
				-319.816	0.0						
(19)	70	4 0	RUSLWHFA	0 0			PUSLDWHO	0 0			
			PUSLSFAR	0 0							
(20)	0		-75.12	2.663	0.0						
(21)	70	4 0	RUSLSUB	0 0			PUSLXSUB	0 0			
			PTHAEXH	0 0							
(22)	0		223.90	-1.174	0.0						
(23)	70	3 0	RUSLSUP	0 0			PUSLDWHO	0 0			
(24)	9		225.00	0.0	0.0						

3. Number of variables in addition to the commodities own quantity and price that are endogenous to the LP solution denoting other endogenous variables.
4. Name of the regressor variable--abbreviated, list the commodities own price variable first. The first three characters of this variable are used by the matrix generator to prepare the MPS code name.
5. Identify the code for variable name from master list in segment 5 of figure
6. Identify the code for associated units from the master list in segment 6 of figure Steps 4-6 are repeated for each regressor variable.
7. FØRMAT (1X, I1, 1X, 2I2, 3X, 2(2A8, 2I2, 10X)).
8. Restriction--User must define as many variable names and codes as there are regressors. Two variables are included per card and several cards can be used, in which the second and remaining cards are blank in cc 1-10.

The disappearance equation parameters (sections 3 and 15 of table 5) identify the magnitudes which go with the user defined variables. They were constructed as:

1. Equation intercept.
2. Commodities own price coefficient.
3. Blank.
4. Exogenous variables coefficient.
5. Level of exogenous variable determined outside the model--steps 4 and 5 are repeated for each exogenous variable.
6. FØRMAT (10X, 7F10.0).
7. Restriction--Coefficients are defined for all regressor variables and also in the order appearing on the equation variable cards. Use as many cards as needed, in which the second and remaining cards are blank in cc 1-20. Include the level of population if it is a per capita function; the coefficient space remains blank.

The additional endogenous variables (sections 4 and 16 of table 5) are included on a special format. As many cards are prepared as the user defined such variables on the equation variables cards. The coding would be constructed as:

1. "-1".
2. Endogenous variable name in exact MPS code, where the characters denoted as $¢¢¢*@ are:

   $ = Q for quantity, P for price;
   ¢¢¢ = three-character country code as on the country name card;
   * = S for supply, D for demand; and
   @ = commodity code, e.g., L for long, S for round, P for low quality.

3. Identify the code for the variable name from master list in segment 5 of figure 3.

4. Identify the code for associated units from master list in segment 6 of figure 3.
5. Coefficient for endogenous variable.
6. FØRMAT (I2, 8X, 2I2, 18X, F10.4).
7. Restrictions--User must set up one card for each additional endogenous variable. The second and remaining cards are blank in cc 1-2.

The production equation variables cards and production equation parameter cards (sections 5-6 and 17-18 of table 5) are identical in form to the disappearance equation variables and parameter cards. The code regarding equation type "1" denotes total production and "4" denotes per acre production, where the matrix generator will multiply yield by acres harvested to obtain total production.

The price equation names (sections 7, 9, 11, 19, 21 and 23 of table 5) are entered in a more complicated fashion. Each endogenous price must be identified in the exact MPS code to link with those constructed by the matrix generator. The cards were constructed as:

1. "7" denotes a price variable names card.
2. "9" denotes that the equation has an exogenous variable, blank otherwise.
3. Number of regressor variables + 1 -- the "1" takes account of the intercept.
4. Row name--Where the characters denoted as $¢¢¢ **** are:

   $ = "R" for row name.
   ¢¢¢ = three-characters country code as on the country name card.
   **** = user defined characters.

5. Price name--the exact MPS name must be constructed for endogenous variables. This name is used to tie into the computer constructed price variables for production and disappearance where the characters denoted as $¢¢¢ *@@@ were: (List the dependent price first)

   $= "P" for price.
   ¢¢¢ = three-character country code as on the country name card.
   * = S for production, D for disappearance.
   @@@ = type of price--These are found as the first three characters of the commodities own price name on the appropriate production or disappearance equation variable card, e.g., "FAR" in segment 5 of table 5.

6. FØRMAT (2I1, 1X, I1, 4X, 2(2A8, 14X)).
7. Restrictions--Only endogenous variables must be listed in exact MPS code. If there are exogenous variables, their naming is flexible because their impact is consolidated with the intercept. Thus, they have no name-linkage in the LP matrix. The second and remaining cards begin in cc 11. Prices, e.g., PUSLXSUB in section 21 of table 5, which are not at the same time a supply

or demand price, have flexibility in selecting characters in the * and @@@ positions.

The price equations parameters identify the magnitudes which go with the user defined variables (sections 8, 10, 12, 20, 22 and 24 of table 5). This information was constructed as:

1. "9" if this is the last card for the country, otherwise it is left blank.
2. Equation intercept.
3. Coefficient of the first variable on the second price name card. The coefficient of the row name and the dependent variable on the first card are assumed as 1.0.
4. Blank.
5. Coefficient of the exogenous variable (if any).
6. Level of the exogenous variable--Steps 5 and 6 are repeated for each exogenous variable.
7. FØRMAT (I1, 9X, 7F10.0).

Master list of regions and countries.--Segment 20 of figure 3 contains information about how countries are to be grouped into regions in the summary reports. The cards shown in table 6 were constructed as:

1. Region name.
2. Three-character code for country which is part of that region.
3. FØRMAT (2A8, 4X, 12(A3, 2X)).
4. Restriction--Up to 12 countries can be entered on one card. After all countries have been entered for a region, enter "999". Enter "WORLD TOTAL" after all designated regions to denote the end of the master list. No more than eight regions can be designated.

Ranges and bounds.--Segments 10 and 11 in figure 3 are alternative to developing country equations for policy and resource restraints. This information is transferred in identical format to the MPS algorithm. Consequently, it was constructed in table 7 as:

1. Use "RANGES" or "BOUNDS" keywords in cc 1 of the first card of each set.
2. Set up the range and bound information in exact MPS format. Contact an MPS manual for details.
3. FØRMAT (16A4).
4. Restrictions--List ranges first, if any, then bounds.

Option variables.--Segment 21 of figure 3 specifies additional endogenous variables which were included by the report writer. The MPS solution values for the price and quantity in the production and disappearance functions are printed automatically, other variables are printed by specifying the information in table 8 as follows:

1. Exact MPS code name of the desired variable.
2. User specified variable name.

Table 6--Master list of countries by region

AFRICA	EGY	MRA	AFI	SAF	999						
WEST ASIA	ARA	WAS	999								
SOUTH ASIA	BSH	CEY	IND	NEP	PAK	999					
SOUTH EAST ASIA	BUR	CAM	SVN	THA	999						
EAST ASIA	MAL	HKG	JAP	SKO	TAI	PHI	INA	OCE	SGP	AUS	999
COMMONIST ASIA	CAS	999									
EUROPE	EEC	ITA	EEX	ENI	EEI	999					
WESTERN HEMISPHERE	USS	USL	BZL	CAN	CUB	WHE	OWH	999			
WORLD TOTAL											

Table 7--Ranges and bounds

RANGES				
RNG1	CLEARING	10000.	CLEARSHT	10000.
RNG1	CLEARLOW	10000.		
BOUNDS				
FX BND1	PJAPSFAR	305.		
FX BND1	PEEIDRET	73.		
FX BND1	PEECDIMP	336.		

Table 8--Additional variables to be included in report writer

PEECTAX VARIABLE LEVEY	U.S. $ PER METRIC TON
PTHAEXH EXPORT PRICE HIGH QUALITY	U.S. $ PER METRIC TON
PTHAEXL EXPORT PRICE LOW QUALITY	U.S. $ PER METRIC TON
PUSSEXR FAO ROUND GRAIN INDEX	INDEX, 1957-59=100
PUSLXSUB LONG GRAIN EXPORT SUBSIDY	U.S. $ PER METRIC TON
PUSSXSUB SHORT GRAIN EXPORT SUBSIDY	U.S. $ PER METRIC TON
9999999	

3. User specified units. The variable name and units are printed by the report writer.
4. FØRMAT (A8, 2(9A4)).
5. Restriction--Since additional variables are printed out along with the supply and demand prices by country, characters in positions 2-4 of the MPS code must match one of the countries used in the analysis. Otherwise, the report writer ignores the variable since it cannot determine where to write out the information. After all option variables are entered, include "9"s in cc 1-8 to denote an end to this request. Include it even if no request is made.

Print data control card.--In addition to the above information regarding an international trade analysis, there are a few control cards which affect the operation of the programs. The first control card (segment 8 of figure 3) allows the option of printing summary tables by country for debugging purposes before the LP is run and/or for analytical purposes at the end of the run. When running many similar analyses, printing country summary tables may be suppressed to save cost. It is shown in step 5 below and was recorded as:

1. Blank if country summary tables are desired before the LP solution; -1 if they are not desired.
2. Blank if country summary tables are desired at the end of the run; -1 if they are not desired.
3. User specified comment to be printed on output.
4. FØRMAT (2I4, 18A4).
5. -1 -1 DO NOT PRINT ANY COUNTRY SUMMARIES.

Data control card.--Segment 7 of figure 3 tells the matrix generator how and where to set up the information for the LP algorithm. It is shown in step 10 below and was recorded as:

1. Name of data set. It is the same as would appear in MPS control cards.
2. Name of objective row. It is the same as would appear in MPS control cards.
3. Number of the output device on which the LP matrix in MPS format was placed.
4. A code for each of the commodities to denote alternative formulations of the market clearing rows.
   a. Production to equal consumption (code = 0).
   b. Production to equal or exceed consumption (code = 1).
   c. Consumption to equal or exceed production (code = 2). When preparing the country data in the MPS code, the matrix generator can save some money by not having to search through the entire list of endogenous variables to determine if the variable being added is unique or if it merely needs a linkage. This control parameter indicates the fractional part of the vector of endogenous names that is to be searched beginning with the last addition and proceeding back through the list.

If the field is left blank, the entire vector will be searched. Specify a number from 0.0 to 1.

5. Indicate the desired objective function from among three alternative formulations.
   a. Optimize the difference between production and disappearance (code = 0).
   b. Optimize production (code = 1).
   c. Optimize disappearance (code = 2).
6. Indicate whether a square matrix is desired, when the number of columns exceed the number of rows.
   a. To have dummy rows added when columns exceed rows (code = 0).
   b. To leave matrix dimensions as initially set up (code ≠ 0).
7. In a situation where the production and disappearance equations are not independently estimated, a degree of market segmentation is achieved by indicating the desired slippage of excess production between the first commodity and the third commodity.
   a. No slippage permitted (code = 0).
   b. Slippage from the first commodity to the third (code = 1).
   c. Slippage from the third commodity to the first (code = 2).
8. Indicate desired slippage of excess production between the second commodity and the third by coding similar to step 7 above.
9. FØRMAT (A8, 2X, A8, 2X, I2, 38X, 3I1, 2X, F2.1, 1X, 2I1, 8X, 2I1).
10. RICETEAM DUMMYOBJ.

Flag card.--Since the software package allows up to 39 countries, the matrix generator needs to know when all countries have been read. This information (segment 9 of figure 3) is contained in step 4 below and was recorded as:

1. "99".
2. "FLAG".
3. FØRMAT (I2, 8X, A4).
4. 99 FLAG.

Title card.--The report writer labels the output such that a user can more easily identify and catalog a large number of analyses. The one-line title (segment 19 of figure 3) shown in step 3 below was recorded as:

1. User specified title for the analysis.
2. FØRMAT (20A4).
3. 1971 CURRENT U. S. PROGRAM, NORMAL WEATHER, LONG - ROUND SPLIT.

The set of linear equations developed by the matrix generator (segment 2 of figure 3) is fed directly into the MPS/360 package. The matrix generator also sets up the range and bound constraints. Thus a researcher needs little technical knowledge of MPS formatting.

READCOMM AND JCL.--The matrix generator (segment 2 of figure 3), report writer (segment 13 of figure 3) and the MPS linkage (segment 17 of figure 3) can be obtained upon request from the authors. A computer

specialist can assist in developing the READCOMM (segment 15 of figure 3) and the appropriate JCL (segments 1, 3, 12, 14, 16, 18 and 22 of figure 3). When a feasible solution is obtained, the values are printed in the usual MPS format and fed directly into the report writer for developing tables.

Interpreting Output Tables

The report writing program selects certain items from the MPS solution, performs computations, and prints three tables that are more readable than either the matrix generator input data or the MPS solution printout. The increased readability is due to both organization and greater explanatory detail as compared to the abbreviated input data and MPS activity names. In addition, the results of desired additional computations are obtained.

Country summary tables require one page of print for each country (table 9). It shows the country name and the percentage breakdown of production and disappearance for the three commodities. The variables in the disappearance and production functions are shown with the associated units. The LP solution levels of the endogenous variables and the assumed levels of the exogenous variables are shown in the appropriate columns. The coefficients of the variables are listed after being multiplied by population or acres in the case of per capita or per acre relationships. The coefficients are multiplied by the regressors to indicate the impact each variable contributes to the final solution. The elasticities are calculated from the slope coefficient and the levels of the variables. The consolidated equations, which are incorporated into the LP matrix, are shown. If more than one regressor variable is endogenous, they are also listed.

Some inconvenience in the tables will be experienced by users analyzing commodities other than rice. The label stub regarding percentage breakdown of production and disappearance at the top of the table, the units on quantity demanded or supplied, and the labels on the left-hand side of the consolidated equations are not user specified. They are included in the format statements of the report writer and would require minor reprogramming to allow flexibility. However, the tables are functional as long as the user does this translation.

Table 10 presents consumption, production, and trade levels by types of rice by country with regional and world totals. The trade figures and totals are calculated by the report writer from the LP solution. The program groups countries in regions specified by the user. The title of the analysis, also specified by the user, is shown at the top of the table. This table allows quick and easy analysis of trade for an individual commodity, a single country, a region, or the world. It shows which countries are importers and exporters and which regions are in a net import or export situation.

Table 9--Country summary information for U.S. round grain and long grain production areas

USA SHORT GRAIN

	PRODUCTION	DISAPPEARANCE
PERCENT LONG/MEDIUM GRAIN HIGH QUALITY	0.0	0.0
PERCENT ROUND GRAIN HIGH QUALITY	70.0	85.0
PERCENT LOW QUALITY (20% OR MORE BROKENS)	30.0	15.0

		CALCULATED LEVEL	ASSUMED LEVEL	COEFFICIENT VALUES	IMPACT	ELASTICITY
DISAPPEARANCE		169.00				
QUANTITY	THOUSAND METRIC TONS					
INTERCEPT / CONSTANT TERM				315.4119	315.4	0.0
SHORT GRAIN WHOLESALE PRICE	U.S. $ PER METRIC TON	202.0	0.0	-0.0532	-10.7	-0.0636
INCOME	U.S.DOL.		4174.0	0.0174	72.6	0.4297
RETAIL PRICE DRY BEANS	U.S. $ PER METRIC TON		489.0	0.2586	126.5	0.7482
TIME	YEAR 1960=60		71.0	0.9536	67.7	0.4006
NEXT YEARS AREA IN RICE	THOUSAND HECTARES		62.0	0.1134	7.0	0.0416
POPULATION	MILLION		207.0	0.0	0.0	0.0
LONG GRAIN QUANTITY DEMANDED	THOUSAND METRIC TONS	862.0	0.0	-0.4043	-348.5	-2.062
LOW QUALITY QUANTITY DEMANDED	THOUSAND METRIC TONS	152.0	0.0	-0.4043	-61.5	0.3636

ROUND GRAIN HIGH QUALITY DISAPREARANCE = 500.8276 -0.0452
-0.3436LONG GRAIN QUANTITY DEMANDED
-0.3436LOW QUALITY QUANTITY DEMANDED

LOW QUALITY DISAPPEARANCE = 88.3814 -0.0080
-0.0606LONG GRAIN QUANTITY DEMANDED
-0.0606LOW QUALITY QUANTITY DEMANDED

PRODUCTION						
QUANTITY	THOUSAND METRIC TONS	255.0				
INTERCEPT / CONSTANT TERM				-25.9800	-26.0	-0.0
SHORT GRAIN FARM PRICE	CALIFORNIA $ PER METRIC TON	111.4	0.0	0.2997	33.4	0.1309
WEATHER	0= GOOD 1= POOR (CALIFORNIA)		1.0	-30.6300	-30.6	-0.1201
TECHNOLOGY	0=POOR 1=GOOD (SOUTH)		1.0	37.1800	37.2	0.1458
AREA IN RICE	THOUSAND HECTARES ROUND GRAIN		67.0	3.5930	240.7	0.9440

ROUND GRAIN HIGH QUALITY PRODUCTION = 154.9107 + 0.2098 SHORT GRAIN FARM PRICE

LOW QUALITY PRODUCTION = 66.3903 + 0.0899 SHORT GRAIN FARM PRICE

Table 9--Country summary information for U.S. round grain and long grain production areas (Continued)

USA LONG GRAIN

	PRODUCTION	DISAPPEARANCE
PERCENT LONG/MEDIUM GRAIN HIGH QUALITY	70.0	85.0
PERCENT ROUND GRAIN HIGH QUALITY	0.0	0.0
PERCENT LOW QUALITY (20% OR MORE BROKENS)	30.0	15.0

		CALCULATED LEVEL	ASSUMED LEVEL	COEFFICIENT VALUES	IMPACT	ELASTICITY
DISAPPEARANCE						
QUANTITY	THOUSAND METRIC TONS	1014.0				
INTERCEPT / CONSTANT TERM				-1244.3948	-1244.4	-0.0
LONG GRAIN WHOLESALE PRICE	U.S. $ PER METRIC TON	225.0	0.0	-0.2062	-46.4	-0.0458
INCOME	U.S.DOL.		4174.0	-0.1143	-477.1	-0.4705
TIME	YEAR 1960=60		71.0	34.0618	2418.4	2.3850
POTATOE PRICE	U.S. $ PER METRIC TON		190.0	0.7535	143.2	0.1412
NEXT YEARS AREA IN RICE	THOUSAND HECTARES		676.0	0.1134	76.7	0.0756
POPULATION	MILLION		207.0	0.0	0.0	0.0
SHORT GRAIN QUANTITY DEMANDED	THOUSAND METRIC TONS	144.0	0.0	0.8487	122.2	0.1205
LOW QUALITY QUANTITY DEMANDED	THOUSAND METRIC TONS	25.0	0.0	0.8487	21.2	0.0209

LONG/MEDIUM GRAIN HIGH QUALITY DISAPPEARANCE = 779.3657 -0.1752 LONG GRAIN WHOLESALE PRICE
+ 0.7214 SHORT GRAIN QUANTITY DEMANDED
+ 0.7214 LOW QUALITY QUANTITY DEMANDED

LOW QUALITY DISAPPEARANCE = 137.5351 -0.0309 LONG GRAIN WHOLESALE PRICE
+ 0.1273 SHORT GRAIN QUANTITY DEMANDED
+ 0.1273 LOW QUALITY QUANTITY DEMANDED

PRODUCTION						
QUANTITY	THOUSAND METRIC TONS	2629.0				
INTERCEPT / CONSTANT TERM				-3030.3499	-3030.3	0.0
LONG GRAIN FARM PRICE	TEXAS $ PER METRIC TON	112.7	0.0	1.0084	113.6	0.0432
AREA IN RICE	THOUSAND HECTARES		738.0	4.3600	3217.7	1.2239
TIME	YEAR 1960=60		71.0	32.7840	2327.7	0.8854
WEATHER	0= GOOD 1= POOR		0.0	-319.8159	-0.0	-0.0

LONG/MEDIUM GRAIN HIGH QUALITY PRODUCTION = 1760.4951 + 0.7059 LONG GRAIN FARM PRICE

LOW QUALITY PRODUCTION = 754.4978 + 0.3025 LONG GRAIN FARM PRICE

Table 10--Rice production, disappearance, and trade for each country by type and quality

1971 NORMAL WEATHER. WITH CURRENT US PROG

COUNTRY OR REGION	LONG/MED GRAIN HIGH QUALITY			ROUND GRAIN HIGH QUALITY			LOW QUALITY 20% OR MORE BROKEN			TOTAL		
	DISP.	PROD.	TRADE	DISP.	PROD.	TRADE	DISP.	PROD.	TRADE	DISP.	PROD.	TRADE
EGYPT	0.	0.	0.	877.	1093.	217.	376.	469.	93.	1252.	1562.	310.
MALAGASY REPUB	0.	0.	0.	253.	252.	-1.	1011.	1009.	-2.	1264.	1262.	-3.
AFRICAN IMPORTER	0.	0.	0.	233.	160.	-73.	2093.	1440.	-653.	2326.	1600.	-726.
SOUTH AFRICA	107.	0.	-107.	0.	0.	0.	0.	0.	0.	107.	0.	-107.
AFRICA	107.	0.	-107.	1362.	1506.	144.	3480.	2918.	-562.	4950.	4424.	-526.
TOTAL IMPORTS			-107.			-73.			-655.			-836.
TOTAL EXPORTS			0.			217.			93.			310.
NEAR EAST SGRAIN	0.	0.	0.	228.	156.	-72.	76.	39.	-37.	303.	195.	-109.
WEST ASIA LGRAIN	1280.	832.	-448.	0.	0.	0.	320.	208.	-112.	1600.	1040.	-560.
WEST ASIA	1280.	832.	-448.	228.	156.	-72.	396.	247.	-149.	1903.	1235.	-668.
TOTAL IMPORTS			-448.			-72.			-149.			-668.
TOTAL EXPORTS			0.			0.			0.			0.
BANGLADESH	555.	497.	-58.	0.	0.	0.	10538.	9434.	-1104.	11093.	9931.	-1162.
CEYLON	0.	0.	0.	308.	203.	-105.	1231.	812.	-419.	1539.	1015.	-524.
INDIA	7859.	8148.	289.	0.	0.	0.	35804.	34738.	-1066.	43664.	42886.	-777.
NEPAL	0.	0.	0.	0.	0.	0.	1169.	1478.	309.	1169.	1478.	309.
PAKISTAN	578.	768.	190.	0.	0.	0.	1349.	1560.	211.	1927.	2328.	401.
SOUTH ASIA	8992.	9413.	421.	308.	203.	-105.	50091.	48023.	-2069.	59391.	57639.	-1752.
TOTAL IMPORTS			-58.			-105.			-2589.			-2463.
TOTAL EXPORTS			479.			0.			521.			711.
BURMA	899.	1052.	153.	0.	0.	0.	3594.	4207.	612.	4493.	5258.	766.
CAMBODIA LAOS	483.	482.	-1.	0.	0.	0.	1933.	1927.	-6.	2416.	2409.	-7.
SOUTH VIETNAM	774.	779.	5.	0.	0.	0.	3098.	3116.	18.	3872.	3895.	23.
THAILAND	4018.	5276.	1258.	0.	0.	0.	2678.	3517.	839.	6696.	8793.	2097.
SOUTH EAST ASIA	6174.	7588.	1415.	0.	0.	0.	11303.	12767.	1464.	17477.	20355.	2878.
TOTAL IMPORTS			-1.			0.			-6.			-7.
TOTAL EXPORTS			1416.			0.			1469.			2885.
MALAYSIA	1027.	812.	-215.	0.	0.	0.	440.	348.	-92.	1468.	1160.	-308.
HONG KONG	343.	7.	-336.	0.	0.	0.	33.	1.	-37.	381.	8.	-373.
JAPAN	0.	0.	0.	9350.	9458.	108.	1781.	2364.	583.	11131.	11822.	691.
SOUTH KOREA	0.	0.	0.	2547.	2175.	-372.	2258.	1779.	-479.	4805.	3954.	-852.
TAIWAN	1265.	1186.	-79.	0.	0.	0.	844.	791.	-53.	2109.	1977.	-132.
PHILIPPINES	2691.	2664.	-27.	0.	0.	0.	850.	666.	-184.	3541.	3330.	-211.
INDONESIA	4303.	4053.	-249.	0.	0.	0.	10040.	9458.	-581.	14342.	13512.	-831.
OCEANIA	0.	0.	0.	78.	0.	-78.	20.	0.	-20.	98.	0.	-98.
SINGAPORE	187.	0.	-187.	0.	0.	0.	66.	0.	-66.	252.	0.	-252.
AUSTRALIA	0.	0.	0.	30.	133.	103.	8.	33.	26.	38.	157.	129.
CHINA AND OTHERS	42482.	43055.	573.	0.	0.	0.	28321.	28703.	382.	70802.	71758.	955.
EAST ASIA	52298.	51778.	-520.	12006.	11766.	-240.	44664.	44144.	-521.	108968.	107637.	-1281.
TOTAL IMPORTS			-1093.			-450.			-1512.			-3056.
TOTAL EXPORTS			573.			210.			992.			1775.
EUROPEAN COM	430.	46.	-384.	0.	0.	0.	53.	12.	-42.	483.	58.	-425.

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Table 10--Rice production, disappearance, and trade for each country by type and quality (Continued)

ITALY	0.	0.	0.	200.	473.	273.	50.	118.	68.	250.	592.	342.
SPAINAND GREECE	0.	0.	0.	202.	278.	76.	22.	31.	8.	225.	309.	84.
EUROPE NET IMPOR	231.	119.	-112.	0.	0.	0.	15.	8.	-7.	246.	127.	-119.
USSR AND OTHERS	0.	0.	0.	833.	722.	-111.	833.	722.	-111.	1667.	1445.	-222.
EUROPE	651.	166.	-496.	1236.	1474.	238.	974.	891.	-83.	2871.	2530.	-341.
TOTAL IMPORTS			-496.			-111.			-160.			-766.
TOTAL EXPORTS			0.			349.			77.			426.
USA SHORT GRAIN	0.	0.	0.	143.	178.	35.	25.	76.	51.	169.	255.	86.
USA LONG GRAIN	862.	1840.	978.	0.	0.	0.	152.	789.	637.	1014.	2629.	1615.
BRAZIL	2422.	2410.	-13.	0.	0.	0.	1485.	1477.	-8.	3907.	3836.	-21.
CANADA	45.	0.	-45.	0.	0.	0.	5.	0.	-5.	50.	0.	-50.
CUBA	202.	135.	-66.	0.	0.	0.	303.	203.	-100.	505.	339.	-166.
WESTERN HEM EXP	344.	649.	306.	0.	0.	0.	802.	794.	-8.	1146.	1443.	298.
W. HEMIS. O/IMP	509.	360.	-149.	0.	0.	0.	764.	841.	77.	1273.	1201.	-72.
WESTERN HEMISPHE	4384.	5395.	1011.	143.	178.	35.	3536.	4180.	644.	8063.	9753.	1690.
TOTAL IMPORTS			-273.			0.			-121.			-308.
TOTAL EXPORTS			1284.			35.			765.			1999.
WORLD TOTAL	73896.	75172.	1276.	15282.	15282.	-0.	114444.	113168.	-1276.	203622.	203622.	-0.
TOTAL IMPORTS			-2477.			-811.			-5192.			-8105.
TOTAL EXPORTS			3752.			811.			3916.			8105.

Users analyzing other commodities will experience slight inconvenience with this table. Al' labels are user specified except the column headings. Consequently, the user must translate the labels for his commodities.

Table 11 shows a list of prices determined within the LP solution. Generally, there are two prices per country. In cases where a country either consumes or produces, but not both, or where the same price series was used in both the production and disappearance functions, only one price would be displayed, accompanied by an explanation of the reason for omitting the other price. The user has the option of requesting other endogenous variables by referring to their MPS name. These are reported along with the production and disappearance price for the appropriate country.

All information is user specified in this table. The set of country summary tables, trade quantities, and prices provides a base of easily accessible data for policy and programs analysis.

Table 11--Rice prices affecting production and disappearance by country

EGYPT		
SHORT GRAIN FARM PRICE	U.S. $ PER METRIC TON	81.35
SHORT GRAIN FARM PRICE	U.S. $ PER METRIC TON	77.71
MALAGASY REPUB		
LOW QUALITY FARM PRICE	U.S. $ PER METRIC TON	58.59
LOW QUALITY WHOLESALE PRICE	U.S. $ PER METRIC TON	125.61
AFRICAN IMPORTER		
LOW QUALITY FARM PRICE	U.S. $ PER METRIC TON	58.59
SAME PRICE USED IN PRODUCTION AND DISAPPEARANCE EQUATIONS		
SOUTH AFRICA		
LONG GRAIN RETAIL PRICE	U.S. $ PER METRIC TON	383.77
NO PRODUCTION		
NEAR EAST SGRAIN		
FAO ROUND GRAIN PRICE INDEX	INDEX	90.07
SAME PRICE USED IN PRODUCTION AND DISAPPEARANCE EQUATIONS		
WEST ASIA LGRAIN		
LONG GRAIN IMPORT PRICE	U.S. $ PER METRIC TON	144.13
SAME PRICE USED IN PRODUCTION AND DISAPPEARANCE EQUATIONS		
BANGLADESH		
LOW QUALITY RETAIL PRICE	U.S. $ PER METRIC TON	84.87
SAME PRICE USED IN PRODUCTION AND DISAPPEARANCE EQUATIONS		
CEYLON		
LOW QUALITY EXPORT PRICE	U.S. $ PER METRIC TON	90.07
LOW QUALITY RETAIL PRICE	U.S. $ PER METRIC TON	46.66
INDIA		
LONG GRAIN RETAIL PRICE	U.S. $ PER METRIC TON	82.31
LOW QUALITY FARM PRICE	U.S. $ PER METRIC TON	44.44
NEPAL		
LONG GRAIN FARM PRICE	U.S. $ PER METRIC TON	69.70
LOW QUALITY FARM PRICE	U.S. $ PER METRIC TON	49.27
PAKISTAN		
LOW QUALITY RETAIL PRICE	U.S. $ PER METRIC TON	45.16
SAME PRICE USED IN PRODUCTION AND DISAPPEARANCE EQUATIONS		

Table 11--Rice prices affecting production and disappearance by country (Continued)

BURMA		
LOW QUALITY FARM PRICE	U.S. $ PER METRIC TON	9.38
SAME PRICE USED IN PRODUCTION AND DISAPPEARANCE EQUATIONS		
CAMBODIA LAOS		
LOW QUALITY WHOLESALE PRICE	U.S. $ PER METRIC TON	58.67
SAME PRICE USED IN PRODUCTION AND DISAPPEARANCE EQUATIONS		
SOUTH VIETNAM		
LONG GRAIN RETAIL PRICE	U.S. $ PER METRIC TON	181.40
LOW QUALITY FARM PRICE	U.S. $ PER METRIC TON	83.28
THAILAND		
LONG GRAIN WHOLESALE PRICE	U.S. $ PER METRIC TON	70.31
SAME PRICE USED IN PRODUCTION AND DISAPPEARANCE EQUATIONS		
EXPORT PRICE HIGH QUALITY	U.S. $ PER METRIC TON	134.77
EXPORT PRICE LOW QUALITY	U.S. $ PER METRIC TON	78.93
FAO POUND GRAIN INDEX	INDEX, 1957-59=100	90.07
FAO LONG-MEDIUM GRAIN INDEX	INDEX, 1957-59=100	89.52
MALAYSIA		
LONG GRAIN IMPORT PRICE	U.S. $ PER METRIC TON	107.93
LOW QUALITY RETAIL PRICE	U.S. $ PER METRIC TON	218.31
HONG KONG		
LOW QUALITY EXPORT PRICE	U.S. $ PER METRIC TON	119.91
NO PRODUCTION		
JAPAN		
SHORT GRAIN WHOLESALE PRICE	U.S. $ PER METRIC TON	350.29
SAME PRICE USED IN PRODUCTION AND DISAPPEARANCE EQUATIONS		
SOUTH KOREA		
SHORT GRAIN RETAIL PRICE	U.S. $ PER METRIC TON	244.04
LOW QUALITY FARM PRICE	U.S. $ PER METRIC TON	201.76
TAIWAN		
LONG GRAIN WHOLESALE PRICE	U.S. $ PER METRIC TON	134.43
LONG GRAIN FARM PRICE	U.S. $ PER METRIC TON	132.71
PHILIPPINES		
LONG GRAIN FARM PRICE	U.S. $ PER METRIC TON	85.00
SAME PRICE USED IN PRODUCTION AND DISAPPEARANCE EQUATIONS		
INDONESIA		
LOW QUALITY RETAIL PRICE	U.S. $ PER METRIC TON	102.73
SAME PRICE USED IN PRODUCTION AND DISAPPEARANCE EQUATIONS		

Table 11--Rice prices affecting production and disappearance by country (Continued)

OCEANIA		
LONG GRAIN IMPORT PRICE	U.S. $ PER METRIC TON	156.02
NO PRODUCTION		
SINGAPORE		
LONG GRAIN RETAIL PRICE	U.S. $ PER METRIC TON	179.53
NO PRODUCTION		
AUSTRALIA		
SHORT GRAIN FARM PRICE	U.S. $ PER METRIC TON	48.11
SAME PRICE USED IN PRODUCTION AND DISAPPEARANCE EQUATIONS		
CHINA AND OTHERS		
LOW QUALITY EXPORT PRICE	U.S. $ PER METRIC TON	106.35
FAO LONG MED GRAIN PRICE INDEX	INDEX	89.52
EUROPEAN COM		
LONG GRAIN IMPORT PRICE	U.S. $ PER METRIC TON	336.00
NO PRODUCTION		
ITALY		
SHORT GRAIN FARM PRICE	U.S. $ PER METRIC TON	199.07
SAME PRICE USED IN PRODUCTION AND DISAPPEARANCE EQUATIONS		
SPAINAND GREECE		
SHORT GRAIN WHOLESALE PRICE	U.S. $ PER METRIC TON	204.46
SAME PRICE USED IN PRODUCTION AND DISAPPEARANCE EQUATIONS		
EUROPE NET IMPOR		
LONG GRAIN IMPORT PRICE	U.S. $ PER METRIC TON	168.83
NO PRODUCTION		
USSR AND OTHERS		
SHORT GRAIN RETAIL PRICE	U.S. $ PER METRIC TON	26.20
SAME PRICE USED IN PRODUCTION AND DISAPPEARANCE EQUATIONS		
USA SHORT GRAIN		
SHORT GRAIN WHOLESALE PRICE	U.S. $ PER METRIC TON	202.00
SHORT GRAIN FARM PRICE	CALIFORNIA $ PER METRIC TON	111.41
USA LONG GRAIN		
LONG GRAIN WHOLESALE PRICE	U.S. $ PER METRIC TON	225.00
LONG GRAIN FARM PRICE	TEXAS $ PER METRIC TON	112.70
BRAZIL		
LONG GRAIN RETAIL PRICE	U.S. $ PER METRIC TON	224.01
LOW QUALITY FARM PRICE	U.S. $ PER METRIC TON	66.56
CANADA		
LONG GRAIN IMPORT PRICE	U.S. $ PER METRIC TON	179.30

Table 11--Rice prices affecting production and disappearance by country (Continued)

NO PRODUCTION

CUBA		
LOW QUALITY EXPORT PRICE	U.S. $ PER METRIC TON	78.93
LONG GRAIN IMPORT PRICE	U.S. $ PER METRIC TON	132.76
WESTERN HEM EXP		
LOW QUALITY WHOLESALE PRICE	U.S. $ PER METRIC TON	139.79
SAME PRICE USED IN PRODUCTION AND DISAPPEARANCE EQUATIONS		
W. HEMIS. O/IMP		
LOW QUALITY EXPORT PRICE	U.S. $ PER METRIC TON	78.93
LOW QUALITY FARM PRICE	U.S. $ PER METRIC TON	136.56

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